The University of Iowa
The College of Liberal Arts and Sciences
Fall, 2024

Title of Course: DATA:4610:0001 Data Acquisition and Management.
Course meeting time and place: 5:00 p.m.– 6:15 p.m. Monday and Wednesday in 30 Schaeffer Hall
Department of Statistics and Actuarial Science: https://stat.uiowa.edu

Course ICON site: To access the course site, log into https://uiowa.instructure.com/courses/240847 using your Hawk ID and password.

Course Home
For Undergraduate Courses: The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.
For Graduate Courses: The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the academic deadlines set by the Graduate College.

Instructor: Ruitao Liu
Office location: 258 SH
Student drop-in hours: Office hours are held on Wednesday and Thursday from 10:00 a.m. to 11:30 a.m. Students are welcome to visit during these times to discuss any questions or concerns regarding the course material. I am also available by appointment if you are unable to attend my drop-in hours.
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Departmental Executive Officer (DEO): Kung-Sik Chan, 241 SH, kung-sik-chan@uiowa.edu

Description of Course
This course provides a comprehensive introduction to data manipulation using PostgreSQL, a powerful open-source relational database management system. Designed for aspiring data analysts and data scientists, the course emphasizes practical skills that are directly relevant to real-world data analysis tasks. Students will learn how to use SQL for querying, transforming, and analyzing data, with a particular focus on PostgreSQL's unique features.

Through hands-on exercises and real interview question simulations, participants will develop a strong foundation in SQL, essential for preparing for data analyst and data scientist roles. The course covers topics such as data retrieval, filtering, aggregation,

and joining, ensuring that students are well-equipped to handle data manipulation tasks in a professional setting.

Notably, this course does not cover data engineering topics such as ETL processes or database design, allowing for a focused exploration of data analysis skills. Whether you are new to SQL or seeking to enhance your proficiency, this course will equip you with the necessary tools to succeed in the data analytics field.

Learning Objectives

- **Master Fundamental SQL Concepts and Syntax:** Develop a solid understanding of SQL basics, including command structures, data types, and key clauses such as SELECT, FROM, WHERE, and ORDER BY.
- **Design and Execute Complex Queries in PostgreSQL:** Learn to create sophisticated queries to retrieve, filter, and transform data, enhancing your ability to solve real-world data problems.
- **Utilize Joins for Multi-Table Queries:** Gain expertise in using different types of joins (INNER, LEFT, RIGHT, FULL) to effectively combine data from multiple tables, an essential skill for data integration and analysis.
- **Employ Aggregation Functions for Data Analysis:** Understand and apply aggregation functions like COUNT, SUM, AVG, MIN, and MAX to perform meaningful data analysis and summarization.
- **Leverage Subqueries for Advanced Data Filtering and Retrieval:** Explore the use of subqueries to handle complex data queries and improve data retrieval processes.
- **Understand and Manage Data Types in PostgreSQL:** Learn how to effectively work with various data types, ensuring accurate data storage and manipulation.
- **Prepare for Data Analyst and Related Job Interviews:** Engage in practical exercises and mock interview scenarios to build confidence and competence in SQL, preparing you for real-world job interviews.
- **Gain Proficiency in Advanced SQL Concepts:** Delve into advanced topics such as window functions, common table expressions (CTEs), and performance optimization techniques, equipping you with the skills needed for complex data analysis tasks.

Textbook/Materials

The primary resource for the course is the instructor's Google Colab notebooks. These notebooks serve as the main instructional material, providing detailed explanations, practical examples, and exercises tailored to the course content. Students are encouraged to actively engage with the notebooks during and outside of class to reinforce their learning and practice their skills.

Here are some online free learning resources that can complement your PostgreSQL course:

- **Official PostgreSQL Documentation:** The official documentation is a comprehensive resource for understanding PostgreSQL's capabilities and syntax. PostgreSQL Documentation
- **Google Colab Documentation:** Google Colab is a free cloud-based platform for writing and running Python/R/SQL code, offering GPU access and easy collaboration. It's widely used for data science and machine learning projects. https://colab.research.google.com/

Academic Honesty and Misconduct
All students in CLAS courses are expected to abide by the college's standards of academic honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. Graduate academic misconduct must be reported to the Graduate College according to Section F of the Graduate College Manual.

Please be aware of the specific academic honesty policies for this course, including the following guidelines:

1. **Collaboration:** While collaboration with classmates is encouraged for learning purposes, all work submitted must be your own unless explicitly stated otherwise. Unauthorized collaboration on homework assignments or exams is prohibited.
2. **Use and Misuse of AI Tools:** The use of AI tools must align with the course's academic integrity policies. Misuse, such as using AI to generate assignments, complete exams, or in any other manner that undermines the learning process, will not be tolerated.

Student Complaints
Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the DEO (Chair) of the department, school or program offering the course. Sometimes students will be referred to the department or program's Director of Undergraduate Studies (DUS) or Director of Graduate Studies (DGS).

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS Dean's Office when additional support is needed.

Drop Deadline for this Course
You may drop an individual course before the drop deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a "W" will appear on your transcript. The mark of "W" is a neutral mark that does not affect your GPA. To discuss how dropping (or staying in) a course might affect your academic goals, please contact your Academic Advisor. Directions for adding or dropping a course and other registration changes can be found on the Registrar's website. Undergraduate students can find policies on dropping CLAS

courses here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

Grading System and the Use of +/-
Your grade will consist of homeworks (75%), 1 midterms (10%), and a final exam (15%). At the end of the semester, homework, midterm, and final grades are normalized within each category in order to calculate the final course grade. A plus-minus grading system will be used. Here is a tentative grading scale:

A	**B**	**C**	**D**	**F**
A+ > 98%	B+ >87%	C+ >77%	D+ >67%	F < 60%
A > 93%	B >83%	C >73%	D >63%	
A- > 90%	B- >80%	C- >70%	D- >=60%	

Course Grades
Final course grades will be assessed based on your performance in the following activities:

Homework: To ensure students are practicing and understanding the course material, weekly homework assignments will be given. These assignments will cover the topics discussed in the lectures and require applying the concepts learned.

There will be a total of approximately 13 homework assignments, with roughly one assignment due each week. Each homework assignment will be worth 20 points. The cumulative total of all homework assignments will account for 75% of the final grade.

These assignments are designed to reinforce the learning objectives and provide regular feedback on your progress. It is important to adhere to the submission deadlines to receive full credit. Late submissions will be accepted up to three days past the due date but will incur a 10% penalty per day.

Homework assignments are critical for mastering the course content, and timely completion will significantly impact your success in this course.

Exams: Students in this course will take two exams (One Midterm and One Final). The midterm exam will contribute 10% to the final course grade. The Final exam will contribute 15% to the final course grade. Each exam will cover material from approximately half of the course, including information presented in lecture, discussion section, and the assigned readings. The exams will test students' knowledge of basic concepts, terms, and general trends discussed in the course. The exams will consist of a mix of short answer, multiple choice, and true/false questions.

Date and Time of the Final Exam
The final examination date and time will be announced by the Registrar generally by the fifth week of classes, and it will be announced on the course ICON site once it is known. **Do not plan your end of the semester travel plans until the final exam**

schedule is made public. It is your responsibility to know the date, time, and place of the final exam. According to the Registrar's final exam policy, students **have a maximum of two weeks after the announced final exam schedule** to request a change if an exam conflict exists or if a student has more than two exams scheduled for the same day (see the policy here).

Calendar of Course Assignments and Exams
Midterm Exam: October 14th
A single two-sided, 8.5" x 11" cheat sheet (handwritten) will be allowed for all exams.

Homework Assignment Schedule: To keep track of all homework assignments, detailed reading assignments, and other important dates, please regularly check the calendar on ICON. The homework assignments will be posted there, along with their due dates and any additional instructions. Regularly checking the ICON calendar will help you keep up with the course requirements and ensure you are well-prepared for all assignments and exams.

Attendance and Absences

Attendance Policy:

- Regular attendance is crucial for success in this course. Students are expected to attend all scheduled classes and participate actively. Attendance will be taken at the beginning of each class.

Absence Policy:

- If you must miss a class, please notify the instructor in advance whenever possible. For planned absences, such as medical appointments or university-related activities, use the absence form available in ICON under Student Tools.
- In the case of unexpected absences due to illness or emergencies, notify the instructor as soon as possible. Documentation may be required for excused absences.
- Students are responsible for catching up on any missed material. Please reach out to classmates or review the course materials provided on the course platform to stay up-to date.
- University regulations require that students be allowed to make up examinations that have been missed due to illness, religious holy days, military service obligations (including service-related medical appointments), or other unavoidable circumstances or University-sponsored activities. Students with UI-authorized activities must discuss their absences with the instructor as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

Late Work Policy:

- Assignments are due on the specified dates. Late submissions will be accepted up to 3 days past the deadline, but a late penalty will be applied: 10% deduction for each day late.
- If you anticipate difficulty meeting a deadline, contact the instructor before the due date to discuss possible accommodations. Extensions may be granted in exceptional circumstances at the instructor's discretion.
- Work submitted more than 3 days after the deadline will not be accepted unless prior arrangements have been made with the instructor.

 Make-Up Work:

- In cases of excused absences, students will be given a reasonable amount of time to complete missed work. It is the student's responsibility to arrange with the instructor to make up any missed assignments or exams.

Communication: UI Email
Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community. For the privacy and the protection of student records, UI faculty and staff can only correspond with UI email addresses.

Where to Get Academic Support for this Course

In addition to my office hours, the University of Iowa offers several valuable resources:

- **Writing Center:** The Writing Center provides free assistance with writing projects for any course. Whether you're drafting a research paper or need help with written assignments, the Writing Center can offer guidance. Visit their website for more information and to schedule an appointment: Writing Center.
- **Tutor Iowa:** Tutor Iowa is a centralized academic support service offering tutoring and other academic resources. It's a great place to find help in a variety of subjects, including statistics, data science, and more. Explore their offerings at Tutor Iowa.

Mental Health Resources and Student Support

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with course-related concerns. For additional mental health support, please see the guidance and resources at mentalhealth.uiowa.edu, including the 24-7 UI Support and Crisis Line.

Additionally, the Office of the Dean of Students can help students navigate personal crisis situations. They can provide one-on-one support, help with identifying options, and access to basic needs resources (such as food, rent, childcare, etc.). Student Care and Assistance: 132 IMU, dos-assistance@uiowa.edu, or 319-335-1162 and more info: dos.uiowa.edu/assistance

University Policies

Accommodations for Students with Disabilities
The University is committed to providing an educational experience that is accessible to all students. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the

syllabus, the student may seek accommodations through Student Disability Services (SDS). SDS is responsible for making Letters of Accommodation (LOA) available to the student. **The student must provide an LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated.** The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide.

Free Speech and Expression
Absences for Religious Holy Days
Classroom Expectations
Non-discrimination
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings (if appropriate)